

following reasons, and for the additional reason that the examiner has not pointed to a teaching in a single cited reference of the features of claim 1 or 7 and the limitations added by the new claims.

Rejection Under 35 U.S.C. § 102 (e)

The examiner rejected claims 1-12 as anticipated under 35 U.S.C. § 102(e) by Britovsek et al., Clutton et al., Kimberley et al., Schmidt et al., Gibson et al., Berardi et al. Okuda, Maddox et al., Kimberley et al, Kerns et al., Guan et al., Engehausen et al., Bennett, Lenges or Cameron.

Response

In order to establish a case of *prima facie* anticipation, the examiner must establish that a prior art reference discloses every limitation of the claimed invention either explicitly or inherently. *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1346, 51 USPQ2d 1943, 1945 (Fed. Cir. 1999). The examiner has not met this burden.

First of all, the examiner merely alleges that “[e]ach of the cited references teaches a process for preparing polyolefins using a species catalyst of the present invention.” The foregoing does not establish that a single prior art reference discloses a process of “co-oligomerising with ethylene one or more alpha olefins other than ethylene in the presence of [the claimed] metal catalyst system” in which the process conditions comprise an “ethylene pressure of less than 2.5 MPa.” See claim 1 and claims depending therefrom.

As explained in the specification:

It has now been surprisingly found that by tuning reaction conditions, in particular using suitable olefins at appropriate concentrations in an ethylene co-oligomerisation reaction and the specific bis-aryliminepyridine metal catalyst systems used therein, the formation of linear alpha olefins by ethylene-homologation of smaller linear alpha olefins and the formation of alkyl-branched, in particular methyl-branched and/or ethyl-branched, alpha olefins can be greatly enhanced.

Specification, p. 9, ll. 9-18. The claims reflect this “tuning [of] reaction conditions.” Claim 1 and the claims which depend therefrom reflect tuning of the ethylene pressure to less than 2.5 MPa.

The examiner has not pointed to a single reference which teaches each element of the foregoing combination. For example, the examiner points to U.S. Patent No. 6,451,939 to Britovsek, et al. as anticipating the claims. Britovsek broadly teaches a gas phase fluidized bed process “generally operated at relatively low pressure, for example, at 10 to 50 bars.” Britovsek, col. 15 at 14-15. It is applicant’s understanding that 10 to 50 bars is 1 to 5 MPa. However, in the only actual example in which an alpha olefin is co-polymerized with ethylene, the ethylene pressure was 10 bar (Example 19, col. 31, first Table). The examiner has not pointed to a teaching or suggestion in Britovsek of a process in which alpha olefin is co-polymerized with ethylene at “an ethylene pressure of less than 2.5 MPa.”

The examiner certainly has not pointed to a teaching of a process having all of the foregoing conditions, and having a concentration of alpha olefin co-monomer of greater than 5 mol.l⁻¹ (claims 47, 49, 51, 53), of greater than 2.5 mol.l⁻¹ (claims 46, 48, 50, 51), or of greater than 1 mol.l⁻¹ (claims 7 and claims depending therefrom).

The examiner has the burden to establish a *prima facie* case of unpatentability of the pending claims on any grounds, including anticipation. *In re Oetiker*, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). Applicant respectfully submits that it is unfair to demand that the Applicant comb through and distinguish 15 references when the examiner’s own comments about the references fail to establish anticipation.

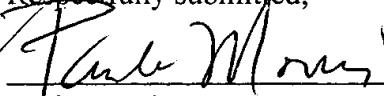
Applicant respectfully requests that the examiner withdraw the rejection based on

anticipation.

CONCLUSION

For all of the foregoing reasons, Applicant respectfully requests that the restriction requirement be withdrawn as to all of the claims, and that all of the claims be allowed. The Commissioner is hereby authorized to charge any fees in connection with this response, or to credit any overpayment, to Deposit Account No. 50-0997 maintained by Paula D. Morris & Associates, P.C.

Respectfully submitted,

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ATTORNEY FOR APPLICANT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
DeBoer et al.

Serial No.: 09/964,714

Filed: September 27, 2001

For: Process for the Co-Oligomerisation of Ethylene and Alpha Olefins



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Group Art Unit: 1713

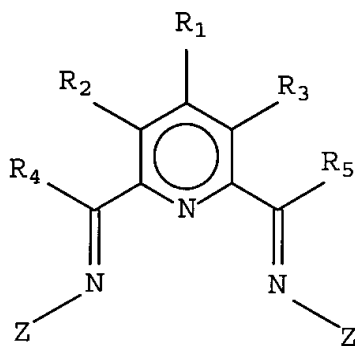
Examiner: Robert D. Harlan

Atty. Docket: SHELL-TS1011

**MARKED UP CLAIMS FILED WITH
RESPONSE TO FIRST OFFICE ACTION**

1. A process for production of higher linear alpha olefins and/or alkyl-branched alpha olefins[, which comprises] comprising:

[the co-oligomerisation] co-oligomerising [of] with ethylene one or more alpha olefins other than ethylene [with ethylene] in the presence of a metal catalyst system employing one or more bis-aryliminepyridine MX_a complexes and/or one or more [bis-aryliminepyridine $MY_p.L_b^+][NC^-]_q$ complexes, said bis-aryliminepyridine complexes comprising a ligand of the formula,



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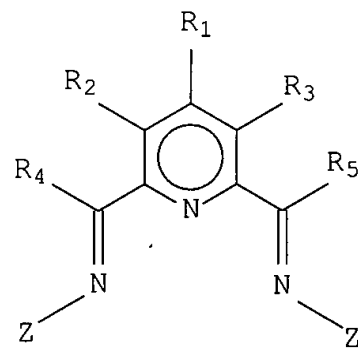
wherein M is a metal atom selected from Fe or Co; a is 2 or 3; X is halide, optionally substituted hydrocarbyl, alkoxide, amide, or hydride; Y is a ligand which may insert an olefin; NC^- is a non-coordinating anion; $p+q$ is 2 or 3, matching the formal oxidation of said metal atom; L is a neutral Lewis donor molecule; $b = 0, 1, \text{ or } 2$; R_1-R_5 are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional

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group, or any two of R₁-R₃ vicinal to one another taken together may form a ring; each Z, which may be identical or different, is an optionally substituted aromatic hydrocarbon ring; an optionally substituted polyaromatic hydrocarbon moiety; an optionally substituted heterohydrocarbyl moiety; or an optionally substituted aromatic hydrocarbon ring in combination with a metal, said optionally substituted aromatic hydrocarbon ring being π -co-ordinated to the metal; [and] said [process is] co-oligomerising being carried out under conditions comprising [at] an ethylene pressure of less than 2.5 MPa.

7. [The process of Claim 1] A process for producing higher linear alpha olefins and/or alkyl-branched alpha olefins comprising:

co-oligomerising with ethylene one or more alpha olefins other than ethylene in the presence of a metal catalyst system employing one or more bis-aryliminepyridine MX_a complexes and/or one or more [bis-aryliminepyridine MY_p.L_b⁺][NC⁻]_q complexes, said bis-aryliminepyridine complexes comprising a ligand of the formula,

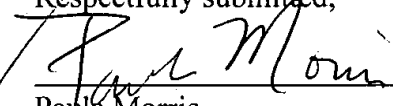


(I)

wherein M is a metal atom selected from Fe or Co; a is 2 or 3; X is halide, optionally substituted hydrocarbyl, alkoxide, amide, or hydride; Y is a ligand which may insert an olefin; NC⁻ is a non-coordinating anion; p+q is 2 or 3, matching the formal oxidation of said metal atom; L is a neutral Lewis donor molecule; b = 0, 1, or 2; R₁-R₅ are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or any two of R₁-R₃ vicinal to one another taken together may form a ring; each Z, which may be identical or different, is an optionally substituted aromatic hydrocarbon ring; an optionally substituted polyaromatic hydrocarbon moiety; an optionally substituted heterohydrocarbyl moiety; or an optionally substituted aromatic hydrocarbon ring in combination with a metal, said optionally substituted aromatic hydrocarbon ring being π -

co-ordinated to the metal; said co-oligomerizing being carried out under conditions comprising an ethylene pressure of less than 2.5 MPa, wherein alpha olefin co-monomer is present in a concentration of greater than 1 mol.l⁻¹.

Respectfully submitted,

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